APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,134	06/25/2001	Peter Brian Denyer	00ED18552605	8833

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EXAMINER
HENN, TIMOTHY J

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 12/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/891,134	DENYER ET AL.
	Examiner	Art Unit	
	Timothy J. Henn	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01 September 2005</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>12-31</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>12-31</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>04 September 2001</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1

September 2005 has been entered.

Response to Arguments

2.   Applicant's arguments with respect to the claims have been considered but are

moot in view of the new ground(s) of rejection.

Drawings

3.   The drawings are objected to under 37 CFR 1.83(a). The drawings must show

every feature of the invention specified in the claims. Therefore, the claimed readout

method must be shown or the feature(s) canceled from the claim(s). No new matter

should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in

reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet,

and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next

Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5.   Claims 12, 13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated

by Yadid-Pechet et al. (US 6,115,065).

[claim 12]

Regarding claim 12, Yadid-Pechet teaches a method of operating a solid-state

image sensing array comprising a plurality of active pixels (Figure 2), the method

comprising: resetting each pixel (c. 6, l. 32 - c. 7, l. 54); reading a first output from each

pixel after a first time period to obtain a first set of image data having a first dynamic

range, the first output representing a cumulative signal during the first period of time

since the prior reset (c. 7, ll. 32-54; T_{1int}); reading a second output from each pixel after

a second period of time since the prior reset and overlapping the first period of time and

without resetting each pixel to obtain a second set of image data having a second

dynamic range, the second output representing a cumulative signal during the second

period of time since the prior reset and overlapping the first period of time (c. 7, ll. 32-

54; T_{2int}); and combining the first and second sets of image data to obtain a resultant set

of image data having a dynamic range different from the first and second dynamic

ranges (c. 6, ll. 24-31).

[claim 13]

Regarding claim 13, Yadid-Pechet teaches reading at least a third output from

each pixel after a third period of time and without resetting each pixel to obtain a third

set of image data having a third dynamic range (c. 7, ll. 32-54, T_{3int}); and combining the

first second a third sets of data (c. 6, ll. 24-31; c. 7, ll. 7-16).

[claim 15]

Regarding claim 15, Yadid-Pechet discloses that the image sensor continues

integrating charge after the first and second readouts without resetting, therefore it can

be seen that the image sensing array is continuously exposed to light as claimed (c. 7,

II. 32-54).

and 31

6.   Claims 16, 17, 19, 26, 27 and 29 are rejected under 35 U.S.C. 102(e) as being

anticipated by Hurwitz (US 6,067,113)

[claim 26]

Regarding claim 26, Hurwitz discloses a solid state image sensor comprising a

plurality of active pixels (Figure 1, Item 2), a vertical shift register connected to rows of

said plurality of active pixels (Figure 2, Item 20); a horizontal shift register connected to

columns of said plurality of active pixels (Figure 2, Item 22); scanning circuitry (a

controlling means to control readout is inherent) connected to the vertical and horizontal

shift registers for reading the plurality of active pixels by resetting and immediately

reading a preliminary output from each pixel (c. 8, II. 23-64), and reading a first output

from each pixel after a first period of time since a prior reset and with the first output

representing a cumulative signal during the first period of time since the prior reset (c. 8,

II. 23-64).

[claim 27]

Regarding claim 27, Hurwitz further discloses determining a difference between

the preliminary outputs and the first outputs to obtain a set of image data substantially

free of noise components (e.g. V_{reset} and V_{off}; c. 8, I. 65 - c. 9, I. 9).

[claim 29]

Regarding claim 29, Hurwitz discloses that the image sensor is continuously

exposed to light at all times (i.e. no optical shutter is used; c. 6, ll. 48-51).

[claim 31]

Regarding claim 31, Hurwitz discloses the use of the plurality of active pixels, the

vertical and horizontal shift registers and scanning circuitry, in a camera system (c. 9, ll.

10-23).

[claims 16, 17 and 19]

Claims 16, 17 and 19 are method claims corresponding to apparatus claims 26,

27 and 29. Therefore, claims 16, 17 and 19 are analyzed and rejected as previously

discussed with respect to claims 26, 27 and 29.

Claim Rejections - 35 USC § 103

7.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

8.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yadid-

Pechet (US 6,115,065) in view of Applicants Admitted Prior Art (AAPA).

[claim 14]

9.   Regarding claim 14, Yadid-Pechet discloses all limitations except for exposure

periods which are integer multiples of a predetermined lighting flicker period. However,

AAPA discloses that CMOS image sensors suffer from horizontal banding interference

when the exposure time is not an integer multiple of a light source flicker period (Page

2, Line 21 - Page 3, Line 1). Therefore, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to make the integration times of the

image readout of Yadid-Pechet integer multiples of a lighting flicker period to correct

horizontal banding interference in the image.

10.   Claims 18 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hurwitz (US 6,067,113) in view of Applicants Admitted Prior Art (AAPA).

[claim 28]

11.   Regarding claim 28, Hurwitz discloses all limitations except for exposure periods

which are integer multiples of a predetermined lighting flicker period. However, AAPA

discloses that CMOS image sensors suffer from horizontal banding interference when

the exposure time is not an integer multiple of a light source flicker period (Page 2, Line

21 - Page 3, Line 1). Therefore, it would have been obvious to one of ordinary skill in

the art at the time the invention was made to make the integration times of the image

readout of Hurwitz integer multiples of a lighting flicker period to correct horizontal

banding interference in the image.

[claim 18]

     Claim 18 is a method claim corresponding to apparatus claim 28. Therefore,

claim 18 is analyzed and rejected as previously discussed with respect to claim 28.

12.   Claims 20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hurwitz (US 6,067,113) in view of Yadid-Pechet (US 6,115,065) in view of Dierickx

(EP 0 858 212 A1).

[claim 30]

Regarding claim 30, Hurwitz lacks reading out a second output from each pixel

after a second time period of time and without resetting the pixel to obtain a second set

of image data having a second dynamic range.

Yadid-Pechet discloses second output representing a cumulative signal during

the second period of time since the prior reset and overlapping the first period of time (c.

7, ll. 32-54; T_{2int}); and combining first and second sets of image data to obtain a

resultant set of image data in order to increase the dynamic range of the image (c. 6, ll.

24-31). Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to apply the image readout of Yadid-Pechet to the sensor

of Hurwitz in order to increase the dynamic range of the images taken by the sensor.

However, Hurwitz in view of Yadid-Pechet does not disclose determining a difference

between a preliminary output and both of first and second outputs to obtain a plurality of

sets of image data each of which is substantially free of noise components.

Dierickx teaches an image readout system which reads first and second outputs

as well as a preliminary output representing a value after a reset. Dierickx further

discloses that the first and second outputs can be subtracted from the reset value

output in a correlated double sampling configuration to remove noise from the first and

second outputs (c. 7, ll. 29-49). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to determine a difference

between a preliminary output and the first and second sets of image data of Hurwitz in

view of Yadid-Pechet to remove noise from the first and second sets of image data.

[claim 20]

Claim 20 is a method claim corresponding to apparatus claim 30. Therefore,

claim 20 is analyzed and rejected as previously discussed with respect to claim 30.

13.   Claims 21, 22, 24 and 25 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Hurwitz et al. (US 6,067,113) in view of Yadid-Pechet (US 6,115,065)

[claim 21]

Regarding claim 21, Hurwitz discloses a solid state image sensor (Figure 1)

comprising: a plurality of active pixels (Figure 1, Item 2); a vertical shift register

connected to rows of said plurality of active pixels (Figure 2, Item 20) and a horizontal

shift register connected to columns of said plurality of active pixels (Figure 2, Item 22).

However, Hurwitz does not disclose scanning circuitry connected to said vertical and

horizontal shift registers for reading said plurality of active pixels by resetting each pixel,

reading a first output from each pixel after a first period of time to obtain a first set of

image data having a first dynamic range, reading a second output from each pixel after

a second period of time and without resetting each pixel to obtain a second set of image

data having a second dynamic range, and combining the first and second sets of image

data to obtain a resultant set of image data having a dynamic range different from the

first and second dynamic ranges.

Yadid-Pechet discloses reading a first output from each pixel after a first time

period to obtain a first set of image data having a first dynamic range, the first output

representing a cumulative signal during the first period of time since the prior reset (c. 7,

II. 32-54; T_{1int}); reading a second output from each pixel after a second period of time

since the prior reset and overlapping the first period of time and without resetting each

pixel to obtain a second set of image data having a second dynamic range, the second

output representing a cumulative signal during the second period of time since the prior

reset and overlapping the first period of time (c. 7, II. 32-54; T_{2int}); and combining the

first and second sets of image data to obtain a resultant set of image data in order to

increase the dynamic range of the image (c. 6, II. 24-31). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to apply the

image readout of Yadid-Pechet to the sensor of Hurwitz in order to increase the

dynamic range of the images taken by the sensor.

[claim 22]

Regarding claim 22, Yadid-Pechet teaches reading at least a third output from

each pixel after a third period of time and without resetting each pixel to obtain a third

set of image data having a third dynamic range (c. 7, II. 32-54, T_{3int}); and combining the

first second a third sets of data (c. 6, II. 24-31; c. 7, II. 7-16).

[claim 24]

Regarding claim 24, Yadid-Pechet discloses that the image sensor continues

integrating charge after the first and second readouts without resetting, therefore it can

be seen that the image sensing array is continuously exposed to light as claimed (c. 7,

II. 32-54).

[claim 25]

Regarding claim 25, Hurwitz in view of Yadid-Pechet discloses the use of the plurality of active pixels, the vertical and horizontal shift registers and scanning circuitry, in a camera system (Hurwitz; c. 9, ll. 10-23).

14.   Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hurwitz et al. (US 6,067,113) in view of Yadid-Pechet (US 6,115,065) in view of Applicant's Admitted Prior Art (AAPA).

[claim 23]

Regarding claim 23, Yadid-Pechet discloses all limitations except for exposure periods which are integer multiples of a predetermined lighting flicker period. However, AAPA discloses that CMOS image sensors suffer from horizontal banding interference when the exposure time is not an integer multiple of a light source flicker period (Page 2, Line 21 - Page 3, Line 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the integration times of the image readout of Yadid-Pechet integer multiples of a lighting flicker period to correct horizontal banding interference in the image.

Conclusion

15.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Henn whose telephone number is (571) 272-7310. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ngoc Yen Vu can be reached on (571) 272-7320. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

TJH
12/8/2005

NGOC-YEN VU
PRIMARY EXAMINER